



## SEQUENCE LISTING

<110> CONTRERAS, ROLAND HENRI  
NELISSEN, BART  
DE BACKER, MARIANNE DENISE  
LUYTEN, WALTER HERMAN MARIA LOUIS  
VIAENE, JASMINE ELZA  
LOGGHE, MARC GEORGE  
VIALARD, JORGE EDUARDO

<120> DRUG TARGETS IN CANDIDA ALBICANS

<130> JAB-1430

<140> 09/857,372

<141> 2001-06-04

<150> PCT/EP99/09833

<151> 1999-12-06

<150> EP 98204122.0

<151> 1998-12-04

<160> 24

<170> PatentIn Ver. 3.3

<210> 1

<211> 438

<212> DNA

<213> Candida albicans

<400> 1

aacagctggt	cttctgctaa	tacattcaac	cctttccata	tctatactcc	aacaatatga	60
taactgatga	acaattgaat	accattgcat	tgacatttgg	ttttgcttca	ataatattaa	120
tcataatata	tcatgccata	tctactaatg	tacataaatt	agaagatgaa	accccatcat	180
cttcatttac	cagaacaaat	actactgaaa	ctactgttgc	aagtaagaaa	aagaagtaat	240
aactgatgga	tttttcttcc	taccaccaat	tgaataatgc	tagacttggt	ggtgtgctac	300
aaatatttca	aaagaaaata	cgaatacttt	ataaaatggt	aagaacggaa	gatgggtttct	360
catttatata	ctaaatacaa	atcacatata	catacacaaa	cacaaatata	tacatacacc	420
tatatccctt	tatttgat					438

<210> 2

<211> 1380

<212> DNA

<213> Candida albicans

<400> 2

atgttaaaaa	cactaactca	aactttacgc	tttaactggga	aagctttccc	aaagggtccgt	60
cgggccttga	tcagaacctt	cgctgccttc	gaccgtttcta	aacctcatgt	caacattggt	120
actattgggtc	atgttgatca	tggtaaaact	acattgactg	ctgctatcac	caaagtttta	180
gccgaacaag	gtggtgccaa	cttcttggat	tatggttcta	ttgatagagc	tccagaagaa	240
agagctagag	gtatcactat	ttccactgcc	cacgttgaat	acgaaaccaa	gaacagacac	300
tatgccacg	ttgattgtcc	aggacacgct	gatttatatca	aaaatatgat	tactggtgcc	360
gctcaaatgg	atggtgctat	cattgttggt	gctgccactg	atgggtcaaat	gcctcaaacc	420
agagaacatt	tggtattggc	cagacaagtt	ggtgttcaag	acttggttgt	gtttgtcaac	480
aaagtcgata	ctattgatga	cctgaaatg	ttggaattag	tcgaaatgga	aatgagagaa	540

ttgttatcca	cctacggttt	tgatggtgac	aacactccag	ttattatggg	atctgcttta	600
atggcttttg	aagacaagaa	accagaaatt	ggtaaggaag	ctatcttgaa	attgttagat	660
gctgctgatg	aacacattcc	aactccatca	agagacttgg	aacaaccatt	tttgttacca	720
gttgaagacg	tggtctccat	ctccggtaga	ggaactgttg	tactggttag	agttgaaaag	780
ggtgttttga	agaaggggtga	agaaatcgaa	attgttggtg	gttttgacaa	accttacaag	840
actactgtta	ccggtattga	aatgttcaaa	aaagaattag	actctgctat	ggctggtgac	900
aactgtggtg	ttttgttaag	aggtgttaaa	agagatgaaa	tcaagagagg	tatggttttg	960
gccaaaccag	gtactgctac	ttctcacaag	aagttcttgg	cttccttgta	tattttgact	1020
tccgaagaag	gtggctggtc	caactccattt	ggtgaagggt	acaagcctca	atgcttcttc	1080
agaactaacg	atgtcactac	cacatttttca	ttcccagaag	gagaagggtg	tgatcattct	1140
caaagtatca	tgccaggtga	caacattgaa	atggttggtg	aattgatcaa	atcttggtcca	1200
ttagaagtca	accaacgttt	caacttgaga	gaaggtggta	aaactggttg	tactggtttg	1260
attaccagaa	tcatcgaaata	aacagaatgt	gcactgtgaa	taataaaaag	aaaagaggta	1320
tatatagggtg	actttgtatt	ttgtattgaa	caataaaaatt	ctgtaaatag	taagggcctc	1380

&lt;210&gt; 3

&lt;211&gt; 2283

&lt;212&gt; DNA

&lt;213&gt; Candida albicans

&lt;400&gt; 3

gaattcgccc	ttaagcactc	gtttcaacta	tacattcagt	aacaacaccc	ttaatttacc	60
aaactacatt	aatggaagta	acacaacgga	cgcagagtca	gacacaacca	acacaacagt	120
caccgacaac	tcagacgcaa	acccaaagca	aagaggacca	gaataggatt	tgtaatttga	180
tttgctccac	gggtcagttt	ggcaattatg	atttgaatat	caacgataaa	actatcgtag	240
aaggtaaaat	gacgtggtat	tttgggaagag	accccaactc	agatttgcaa	gtggcgctgt	300
cgctcgagaat	ttcaaacaaag	cattttcaaaa	tctgggtcaa	cttcaatgat	aaatcactat	360
ggataaaagga	cacttcaact	aacggggacac	accttaacaa	cagtcgattg	gtgaaaggat	420
caaactacct	tcttaatcag	ggtgatgaaa	tagcagttagg	ggttggtaga	gacgaggacg	480
ttgtgaggtt	tgctggtgtc	tttgggtgaca	aatacaaccc	ggcaaagcta	cctgatttcca	540
ccaacacaaat	ttaagatgaa	ggaatataca	aagactttat	tgtgaaaaat	gaaacgatag	600
gccaaaggagc	atttgccact	gtgaaaaagg	cgattgaacg	atctacgggc	gagtcgtacg	660
cgggtgaagat	tataaatcga	agaaaagcat	taaataccgg	tgggtggaagt	gccatggcag	720
gagtggaaccg	tgaattgtcc	atatttagagc	ggctcaacca	cccaaataata	gttgctctaa	780
aagctttttta	tgaagatatg	gacaattact	atattgtgat	ggaattgggtg	ccgggcgggtg	840
atttgatgga	ctttgtggct	gcaaacgggtg	caataggaga	agacgcaaca	caagtgtatca	900
cgaaacagat	tctagaagga	attgcctatg	ttcataattt	aggaatctcc	catcggtgatt	960
tgaagccaga	taatattttg	attatgcaag	atgacccaat	acttggttaa	atcaccgact	1020
ttggattggc	aaaatttcagt	gacaatctga	cgtttatgaa	aactttttgt	ggtacatttg	1080
cgtatgtttgc	tcccgaagtt	atcaccgggtg	agtatggatc	atcgagatg	gaactgcaac	1140
aaaaggacaa	ctactcttcc	ttggttgaca	tttggctctt	gggatgtttg	gtttatgtac	1200
ttttaacttc	tcatattacca	ttcaacggga	aaaaccagca	acaaatgttt	gccaagatca	1260
aaagggggcga	atttcatgag	gctccattaa	attcatacga	catttctgaa	gacggaagag	1320
atttcttgca	gtgctgccta	caggttaatc	ctaaactaag	gatgacggct	gctgaagctt	1380
tgaaacataa	atggttgcaa	gacttgtag	aagaggattc	tgtcaaatca	ttgagtttat	1440
cgcaatcaca	gtcgcaacaa	tctcgaaaga	tagataatgg	tatccatata	gaatcattga	1500
gcaaaaattga	tgaagacgtt	atgcttcgtc	cattggatag	cgaaagaaat	aggaaatcaa	1560
gtaaacagca	agattttcaag	gtacccaagc	gtgtgattcc	gttatctcaa	catcctgcaa	1620
caccgttacc	aatgtcacia	ccgaaaaaga	ggccgtatca	aatagaccct	agaacaaaaca	1680
aaaaagtcga	tttgggaagaa	cctctgacaa	gcaagaaagt	caagctaagt	gattccggtt	1740
ttgcggaaga	ctacttgaag	ttggggccac	ttgcaaatc	gttattccaa	gaaacaataa	1800
atattttcaaa	gtccccgttt	tctttcgga	gaaatgacac	ttgtgattgc	gagatagacg	1860
acgacagact	atccaaactt	cattgtgtca	ttaccaaaaga	aaacgactct	atatggttat	1920
tggtataagag	tactaactcg	tgcttggtca	acaatactag	tggttgaaaa	ggcaacaaag	1980
ttttgcttag	aggagggggag	atattacatc	tcttctttga	cccattgtca	ctgcaacata	2040
taggtttcaa	agtagtcctt	gttgatcaac	tgtctggtga	acataagagt	caagtggagg	2100
ttttgaaaca	aacctcagaa	gaaatgaata	ttattccact	tatttctggt	ttaagtagta	2160

```

taagttcata gatttagcat atatacaagc atttcctata gaaacaaagg ttcattaatt 2220
tagttatttta cctccatgca attacattta cttcttcttc caagggcgaa ttctgcagat 2280
atc 2283

```

```

<210> 4
<211> 826
<212> DNA
<213> Candida albicans

```

```

<400> 4
atgggtagta tgtgaagata caatattgaa agtggtttact agaatatcta agatgtttga 60
gcccatggac attttttgat ttgataatta aaaaaagtag caatagatta ttgcgttgga 120
gaaagaatca ccatagttgc aagatttgat agatgttaaa atgttcacgc aggcgaaaga 180
tgtaacatct cttaaagtaa gaagaatag gacatgaata aaaatagata gcactatttt 240
ggaacttggt gaagatatta aaatagaatg ggatttcaac atagatattc aaagtaacga 300
aacctcacaa tcaaataaaa acaacagtaa tactaacaat tcaattttta tttttataga 360
gggtactcca tctttaggta aacgtcacaa caaatctcac accttatgta acagatgtgg 420
ccgtcgttca ttccacgtcc aaaagaagac ctgttcttct tgtggttacc cagctgctaa 480
aatgagatct cacaactggg ctttaaaagc caaaagaaga agaactactg gtaccggtag 540
aatggcttac ttgaaacacg ttaccagaag attcaagaac ggtttccaaa ctggtgtgac 600
taaagctcaa accccttccg cttaaactaa ttactgaagt tattgggtcat gcattagtca 660
ttattcatta aagtcattgtt aagcatagca aaggaagaat tgggttagatt cttgtttaaa 720
atgtaatgac tatttaatat ctgtttaaat aagagggtta gtctttattt ttttacgtat 780
acaccaaaaa aaaaagaaac aaataaaatc tgtatatata tgttgg 826

```

```

<210> 5
<211> 978
<212> DNA
<213> Candida albicans

```

```

<400> 5
atgggtacta gtacaagtga agcattgaag aacatcaaaa acaaacagcg aagacagaaa 60
gtttttgcag aaataaaaca tgaaaagaat aaacaacgtc ataagcaaag agccgaaaga 120
gtaaggaag aaagagaaaa cccgaatta agagaggaaa gaatagcagc taatatccca 180
gatactatag atagcaaacg tatttatgat gagactatag ctgctgaagt tgaaggagat 240
gacgagtttc agtcataatt cactaaactg ttggaagaac caaagatttt gttgacaaca 300
agtccaatg ctaaaaaacc ggcttatgaa ttgcagaca tgatcatgga ctttttaccg 360
aatgtgacat ttatcaaaaag gaagaaggaa tatacaatgc aagatatggc caaatattgc 420
tcgaatagag acttcactgc attgcttgtc atcaacgaag acaagaagaa ggtcaatggg 480
ataacgctca tcaatttacc tgaagggcca acattttatt tttcgattac atcaatagtt 540
gatgggaaaa gaattaaggg acacgggaaa gctgggtgatt atttacctga gattgtattg 600
aataatttca attcaagatt gggtaaaact gtgggaagac tatttcaaag tattttccct 660
cataaacctg aacttcaagg aagacaagtg attactttgc acaatcaacg tgattatatt 720
tttttcagaa gacatagata tattttcaga aatgaggaaa aggttggtgatt gcagggaattg 780
gggccgcagt ttacattaaa gctaagaaga atgcaaaagg gagtacgtgg tgatgttggt 840
tggaacaca gaccagatat ggaaagagat aagaagaagt tttatttata agcgggtgta 900
taaaggtagt agtagtgcgt ttataagtat gtgtgtgtgt ttatgcatag atgtgtaaag 960
agtaatacac ctaattcg 978

```

```

<210> 6
<211> 619
<212> DNA
<213> Candida albicans

```

<220>  
 <221> modified\_base  
 <222> (597)..(598)  
 <223> a, c, t or g

<220>  
 <221> modified\_base  
 <222> (613)  
 <223> a, c, t or g

<400> 6  
 aactaatttg tttaaacatc aataccaaga agttttttaca attcaatccc acatacacca 60  
 ttaattatga attctgaaaa gattattgaa gttatcattg ctatttttctt accaccagta 120  
 gctgtgttta tgaaatgtgg tgccactacc ccattatgga ttaacttggt attatgtatc 180  
 tttatttggt tccctgctat cttacatgcc ttatacgttg tgttgaaaga ttaaacaac 240  
 accagagatt tactgcttga tgaattgatt actccaaaga gttgtgacta gttcccagtg 300  
 tgtttttttt gccttccaac tttcttttac atttttccat tactaccact gtcttcccc 360  
 ctattttgca gagttttcaa aatttatcca aaacatgtta gtcattaaac catattatta 420  
 taattattct tttttgtatt tttttccctt aaaacacgtt aatttattaa tcgtttcggt 480  
 gtttggtatt ttattttttt gtatttatca attggaatat atatctatac atgaatttat 540  
 tatccattgt accaattggt aaaacatttt gttagttttt tgttactagt ataaaaannat 600  
 aataaaagtt tanttcaac 619

<210> 7  
 <211> 2319  
 <212> DNA  
 <213> Candida albicans

<400> 7  
 atgacattag gggtcgataa attcataagc aagggtcagca ctcatagacg tcaatctgaa 60  
 ccatcaatct tggaaatcgc agccaccaat tctcaaaaata aatcgagaag gctaagtatg 120  
 gataatggtc attgttatgt tcgtgaatca actaataatc atcatcattt aaataccgtc 180  
 gttgataatt tacgacagcg tgcgggatcg ttttcattta tttcacatca ccataatcac 240  
 catcagaata gtcacgataa ttatactgtc gatcccccta catcaaagg agcacgaatt 300  
 tcccgatcac gttcacgttc caaatcagtt gggcacggag aagcaatatc accagcgtat 360  
 ttttccaaga ataaaaccaa agatttagtg aaacaggaaa cagcacatat cattctgaag 420  
 aaattactca acatgtttaca agatttggat ttacaaaacc ctattgcatt gaaaacaata 480  
 tcacaagggt cagaatcaaa gttttgtaaa atctacgtgt ctaacactaa taattgtatt 540  
 tacttaccag cagcaagttc aacaagtttc acttatgaag atgatgaaaa tggcggcggt 600  
 ataattgctg aagatagaaa tgatgaaatg ccaacagcag ttaataacaa tactttgtca 660  
 atggatagta taaatcattc agagactgat ttcttggtt ctccaccacc tccagattta 720  
 ttttctaana tgaaatcatt ccattcacca aattacttga cttcaaaaat cgattctgaa 780  
 tgtccaattc cacatacatt tgctgtgatt gttgaattaa ccaaggactc tttgattatt 840  
 aaagatcttc atttccaatt tcagtcatta actaccattt tatggccaac tggggatgca 900  
 tataatcgga ctcatgccaa ggagaaattt accattggga atatggaatg gcgtacatct 960  
 ttaagcgacg ccgactatta tatcaatagt tctaattcca acgatgttaa gctgaaaaaac 1020  
 ttgggtcctg aagatcttat taatcgaact agagaatata aattaatcga tattgaagaa 1080  
 ccaaacaatt catcaaacag tttactggat gatgacatgg atattaataa tattacgtcg 1140  
 ccattatcaa cgtcaccaac atcaagttca acttcaacaa attcaacctc caactcattg 1200  
 gggtcagatt catataaagc tggcttttat gtatttttat taccaatctt attgccagaa 1260  
 catattcctg cttccattgt ttctattaat gggtcattgg ctcatacatt actgggtgaa 1320  
 tgcaataaat atactgataa gttgaatcgg aaatcaaaaag tatcagcatc gtacaattta 1380  
 cctatggtcc gtactccacc aaacattgggt aattccattg ctgataagcc aatttatgtt 1440  
 aataggattt ggaatgatgc cgtacattat attataactt tccccgcaa atatgttact 1500  
 ttgggttggt aacacatgat aaatgtgaaa ttactgccc tgggtgaaaga tgtggttatc 1560  
 aagcgtatta aatttaattgt attggagaga ataacttatg tttccaaaaa tttatcacga 1620  
 gaatatgatt atgatagtga agacccttat tgtattcatc cagtttctaa agaaaaataa 1680

```

gtacgtgaac gtgttggtgc gttatatgaa ttgaaaacga aggcaaaaca atcttctggt 1740
ggacatcttg aagcttataa acaagaagtt atgaaatgtc cggaaaataa ctttttattt 1800
tcttggttat aggttgaaaa tgataataat aacggcaacg gcaacggcaa cggcaacgga 1860
aacaagaacg ttaaacaata gaataaagat caaccaatga ttgctacacc tttagatata 1920
aatgtttctt taccattttt aactactatg tctgatatgt taattatgac atcagccata 1980
gaagaagaag gttcagatct gcctcataca tcaagaagag ggtcggcagt gagtatgact 2040
gataataata ctacccaag taacaataac cttttatctc catttttggg agcagtggaa 2100
actaatggtg ctagtataaa tgaaattggt gatcatacat tattccctga ttctaatttt 2160
cgacatattg aaattaaaca tcgattacaa gttacattta ggatttctaa accggatctg 2220
gataataaaa tgcataatta tgaagtgggt attgataccc ccatcgtttt acttagttca 2280
aatgtcaag aagattctcc tcctccttat agttctgta 2319

```

```

<210> 8
<211> 255
<212> DNA
<213> Candida albicans

```

```

<400> 8
aacgttcgtg caaaaggcta tactggtgat atccacgcag atgaagagca agtttaataca 60
actctttgtc aattaatgct gtacttggtt tcatcttatt tgctggcatt taaagaatac 120
ccatagttca gaaaataaaa ttgaaaaatt taaaaaaaaa cgcaatatca ttcatttttt 180
ttgttttttt gacaataata ttaatatgta gttaccaatg ttttttagatt ttatatgttt 240
tgaaaaaata gtttg 255

```

```

<210> 9
<211> 119
<212> DNA
<213> Candida albicans

```

```

<220>
<221> modified_base
<222> (45)
<223> a, c, t or g

```

```

<400> 9
aaccttacaa tcattatacc aactatcaaa atcataagac tcttnaactt ctgtttttga 60
tagttggtat aatgatttat gtattatctt aattcattat tattagtttc ggtcacaaa 119

```

```

<210> 10
<211> 60
<212> PRT
<213> Candida albicans

```

```

<400> 10
Met Ile Thr Asp Glu Gln Leu Asn Thr Ile Ala Leu Thr Phe Gly Phe
  1             5             10             15

Ala Ser Ile Ile Leu Ile Ile Ile Tyr His Ala Ile Ser Thr Asn Val
      20             25             30

His Lys Leu Glu Asp Glu Thr Pro Ser Ser Ser Phe Thr Arg Thr Asn
      35             40             45

Thr Thr Glu Thr Thr Val Ala Ser Lys Lys Lys Lys
      50             55             60

```

<210> 11  
 <211> 426  
 <212> PRT  
 <213> Candida albicans

<400> 11  
 Met Leu Lys Thr Leu Thr Gln Thr Leu Arg Leu Thr Gly Lys Ala Phe  
   1                  5                  10                  15  
 Pro Lys Val Arg Pro Ala Leu Ile Arg Thr Tyr Ala Ala Phe Asp Arg  
           20                  25                  30  
 Ser Lys Pro His Val Asn Ile Gly Thr Ile Gly His Val Asp His Gly  
       35                  40                  45  
 Lys Thr Thr Leu Thr Ala Ala Ile Thr Lys Val Leu Ala Glu Gln Gly  
       50                  55                  60  
 Gly Ala Asn Phe Leu Asp Tyr Gly Ser Ile Asp Arg Ala Pro Glu Glu  
       65                  70                  75                  80  
 Arg Ala Arg Gly Ile Thr Ile Ser Thr Ala His Val Glu Tyr Glu Thr  
           85                  90                  95  
 Lys Asn Arg His Tyr Ala His Val Asp Cys Pro Gly His Ala Asp Tyr  
          100                 105                 110  
 Ile Lys Asn Met Ile Thr Gly Ala Ala Gln Met Asp Gly Ala Ile Ile  
      115                 120                 125  
 Val Val Ala Ala Thr Asp Gly Gln Met Pro Gln Thr Arg Glu His Leu  
      130                 135                 140  
 Leu Leu Ala Arg Gln Val Gly Val Gln Asp Leu Val Val Phe Val Asn  
  145                 150                 155                 160  
 Lys Val Asp Thr Ile Asp Asp Pro Glu Met Leu Glu Leu Val Glu Met  
          165                 170                 175  
 Glu Met Arg Glu Leu Leu Ser Thr Tyr Gly Phe Asp Gly Asp Asn Thr  
      180                 185                 190  
 Pro Val Ile Met Gly Ser Ala Leu Met Ala Leu Glu Asp Lys Lys Pro  
      195                 200                 205  
 Glu Ile Gly Lys Glu Ala Ile Leu Lys Leu Leu Asp Ala Val Asp Glu  
      210                 215                 220  
 His Ile Pro Thr Pro Ser Arg Asp Leu Glu Gln Pro Phe Leu Leu Pro  
  225                 230                 235                 240  
 Val Glu Asp Val Phe Ser Ile Ser Gly Arg Gly Thr Val Val Thr Gly  
          245                 250                 255  
 Arg Val Glu Arg Gly Val Leu Lys Lys Gly Glu Glu Ile Glu Ile Val  
      260                 265                 270

Gly Gly Phe Asp Lys Pro Tyr Lys Thr Thr Val Thr Gly Ile Glu Met  
 275 280 285  
 Phe Lys Lys Glu Leu Asp Ser Ala Met Ala Gly Asp Asn Cys Gly Val  
 290 295 300  
 Leu Leu Arg Gly Val Lys Arg Asp Glu Ile Lys Arg Gly Met Val Leu  
 305 310 315 320  
 Ala Lys Pro Gly Thr Ala Thr Ser His Lys Lys Phe Leu Ala Ser Leu  
 325 330 335  
 Tyr Ile Leu Thr Ser Glu Glu Gly Gly Arg Ser Thr Pro Phe Gly Glu  
 340 345 350  
 Gly Tyr Lys Pro Gln Cys Phe Phe Arg Thr Asn Asp Val Thr Thr Thr  
 355 360 365  
 Phe Ser Phe Pro Glu Gly Glu Gly Val Asp His Ser Gln Met Ile Met  
 370 375 380  
 Pro Gly Asp Asn Ile Glu Met Val Gly Glu Leu Ile Lys Ser Cys Pro  
 385 390 395 400  
 Leu Glu Val Asn Gln Arg Phe Asn Leu Arg Glu Gly Gly Lys Thr Val  
 405 410 415  
 Gly Thr Gly Leu Ile Thr Arg Ile Ile Glu  
 420 425

<210> 12  
 <211> 699  
 <212> PRT  
 <213> Candida albicans

<400> 12  
 Met Glu Val Thr Gln Arg Thr Gln Ser Gln Thr Gln Pro Thr Gln Gln  
 1 5 10 15  
 Ser Pro Thr Thr Gln Thr Gln Thr Gln Ser Lys Glu Asp Gln Asn Arg  
 20 25 30  
 Ile Cys Gln Leu Ile Cys Ser Thr Gly Gln Phe Gly Asn Tyr Asp Leu  
 35 40 45  
 Asn Ile Asn Asp Lys Thr Ile Val Gln Gly Lys Met Thr Trp Tyr Phe  
 50 55 60  
 Gly Arg Asp Pro Asn Ser Asp Leu Gln Val Ala Ser Ser Ser Arg Ile  
 65 70 75 80  
 Ser Asn Lys His Phe Gln Ile Trp Leu Asn Phe Asn Asp Lys Ser Leu  
 85 90 95  
 Trp Ile Lys Asp Thr Ser Thr Asn Gly Thr His Leu Asn Asn Ser Arg  
 100 105 110

Leu Val Lys Gly Ser Asn Tyr Leu Leu Asn Gln Gly Asp Glu Ile Ala  
 115 120 125  
 Val Gly Val Gly Arg Asp Glu Asp Val Val Arg Phe Val Val Val Phe  
 130 135 140  
 Gly Asp Lys Tyr Asn Pro Ala Lys Leu Pro Asp Ser Thr Asn Thr Ile  
 145 150 155 160  
 Lys Asp Glu Gly Ile Tyr Lys Asp Phe Ile Val Lys Asn Glu Thr Ile  
 165 170 175  
 Gly Gln Gly Ala Phe Ala Thr Val Lys Lys Ala Ile Glu Arg Ser Thr  
 180 185 190  
 Gly Glu Ser Tyr Ala Val Lys Ile Ile Asn Arg Arg Lys Ala Leu Asn  
 195 200 205  
 Thr Gly Gly Gly Ser Ala Met Ala Gly Val Asp Arg Glu Leu Ser Ile  
 210 215 220  
 Leu Glu Arg Leu Asn His Pro Asn Ile Val Ala Leu Lys Ala Phe Tyr  
 225 230 235 240  
 Glu Asp Met Asp Asn Tyr Tyr Ile Val Met Glu Leu Val Pro Gly Gly  
 245 250 255  
 Asp Leu Met Asp Phe Val Ala Ala Asn Gly Ala Ile Gly Glu Asp Ala  
 260 265 270  
 Thr Gln Val Ile Thr Lys Gln Ile Leu Glu Gly Ile Ala Tyr Val His  
 275 280 285  
 Asn Leu Gly Ile Ser His Arg Asp Leu Lys Pro Asp Asn Ile Leu Ile  
 290 295 300  
 Met Gln Asp Asp Pro Ile Leu Val Lys Ile Thr Asp Phe Gly Leu Ala  
 305 310 315 320  
 Lys Phe Ser Asp Asn Ser Thr Phe Met Lys Thr Phe Cys Gly Thr Leu  
 325 330 335  
 Ala Tyr Val Ala Pro Glu Val Ile Thr Gly Lys Tyr Gly Ser Ser Gln  
 340 345 350  
 Met Glu Ser Gln Gln Lys Asp Asn Tyr Ser Ser Leu Val Asp Ile Trp  
 355 360 365  
 Ser Leu Gly Cys Leu Val Tyr Val Leu Leu Thr Ser His Leu Pro Phe  
 370 375 380  
 Asn Gly Lys Asn Gln Gln Gln Met Phe Ala Lys Ile Lys Arg Gly Glu  
 385 390 395 400  
 Phe His Glu Ala Pro Leu Asn Ser Tyr Asp Ile Ser Glu Asp Gly Arg  
 405 410 415



Asp	Phe	Leu	Gln	Cys	Cys	Leu	Gln	Val	Asn	Pro	Lys	Leu	Arg	Met	Thr	420	425	430	
Ala	Ala	Glu	Ala	Leu	Lys	His	Lys	Trp	Leu	Gln	Asp	Leu	Tyr	Glu	Glu	435	440	445	
Asp	Ser	Val	Lys	Ser	Leu	Ser	Leu	Ser	Gln	Ser	Gln	Ser	Gln	Gln	Ser	450	455	460	
Arg	Lys	Ile	Asp	Asn	Gly	Ile	His	Ile	Glu	Ser	Leu	Ser	Lys	Ile	Asp	465	470	475	480
Glu	Asp	Val	Met	Leu	Arg	Pro	Leu	Asp	Ser	Glu	Arg	Asn	Arg	Lys	Ser	485	490	495	
Ser	Lys	Gln	Gln	Asp	Phe	Lys	Val	Pro	Lys	Arg	Val	Ile	Pro	Leu	Ser	500	505	510	
Gln	His	Pro	Ala	Thr	Pro	Leu	Pro	Met	Ser	Gln	Pro	Lys	Lys	Arg	Pro	515	520	525	
Tyr	Gln	Ile	Asp	Pro	Arg	Thr	Asn	Lys	Lys	Val	Asp	Leu	Glu	Glu	Pro	530	535	540	
Ser	Thr	Ser	Lys	Lys	Val	Lys	Leu	Ser	Asp	Ser	Val	Val	Ala	Glu	Asp	545	550	555	560
Tyr	Leu	Lys	Leu	Gly	Pro	Leu	Ala	Asn	Ser	Leu	Phe	Gln	Glu	Thr	Ile	565	570	575	
Asn	Ile	Ser	Lys	Ser	Pro	Phe	Ser	Phe	Gly	Arg	Asn	Asp	Thr	Cys	Asp	580	585	590	
Cys	Glu	Ile	Asp	Asp	Asp	Arg	Leu	Ser	Lys	Leu	His	Cys	Val	Ile	Thr	595	600	605	
Lys	Glu	Asn	Asp	Ser	Ile	Trp	Leu	Leu	Asp	Lys	Ser	Thr	Asn	Ser	Cys	610	615	620	
Leu	Val	Asn	Asn	Thr	Ser	Val	Gly	Lys	Gly	Asn	Lys	Val	Leu	Leu	Arg	625	630	635	640
Gly	Gly	Glu	Ile	Leu	His	Leu	Phe	Phe	Asp	Pro	Leu	Ser	Ser	Gln	His	645	650	655	
Ile	Gly	Phe	Lys	Val	Val	Leu	Val	Asp	Gln	Ser	Ser	Gly	Glu	His	Lys	660	665	670	
Ser	Gln	Val	Glu	Val	Leu	Lys	Gln	Thr	Ser	Glu	Glu	Met	Asn	Ile	Ile	675	680	685	
Pro	Leu	Ile	Ser	Gly	Leu	Ser	Ser	Ile	Ser	Ser						690	695		

```
<210> 13
<211> 295
<212> PRT
<213> Candida albicans
```

Met	Gly	Thr	Ser	Thr	Ser	Glu	Ala	Leu	Lys	Asn	Ile	Lys	Asn	Lys	Gln
1				5					10					15	
Arg	Arg	Gln	Lys	Val	Phe	Ala	Glu	Ile	Lys	His	Glu	Lys	Asn	Lys	Gln
			20					25					30		
Arg	His	Lys	Gln	Arg	Ala	Glu	Arg	Ala	Lys	Glu	Glu	Arg	Glu	Asn	Pro
		35					40					45			
Glu	Leu	Arg	Glu	Glu	Arg	Ile	Ala	Ala	Asn	Ile	Pro	Asp	Thr	Ile	Asp
	50					55					60				
Ser	Lys	Arg	Ile	Tyr	Asp	Glu	Thr	Ile	Ala	Ala	Glu	Val	Glu	Gly	Asp
65					70					75					80
Asp	Glu	Phe	Gln	Ser	Tyr	Phe	Thr	Asn	Leu	Leu	Glu	Glu	Pro	Lys	Ile
				85					90					95	
Leu	Leu	Thr	Thr	Ser	Ala	Asn	Ala	Lys	Lys	Pro	Ala	Tyr	Glu	Phe	Ala
			100					105					110		
Asp	Met	Ile	Met	Asp	Phe	Leu	Pro	Asn	Val	Thr	Phe	Ile	Lys	Arg	Lys
	115						120					125			
Lys	Glu	Tyr	Thr	Met	Gln	Asp	Met	Ala	Lys	Tyr	Cys	Ser	Asn	Arg	Asp
	130					135					140				
Phe	Thr	Ala	Leu	Leu	Val	Ile	Asn	Glu	Asp	Lys	Lys	Lys	Val	Asn	Gly
145					150					155					160
Ile	Thr	Leu	Ile	Asn	Leu	Pro	Glu	Gly	Pro	Thr	Phe	Tyr	Phe	Ser	Ile
				165					170					175	
Thr	Ser	Ile	Val	Asp	Gly	Lys	Arg	Ile	Lys	Gly	His	Gly	Lys	Ala	Gly
			180					185					190		
Asp	Tyr	Leu	Pro	Glu	Ile	Val	Leu	Asn	Asn	Phe	Asn	Ser	Arg	Leu	Gly
	195						200					205			
Lys	Thr	Val	Gly	Arg	Leu	Phe	Gln	Ser	Ile	Phe	Pro	His	Lys	Pro	Glu
	210					215					220				
Leu	Gln	Gly	Arg	Gln	Val	Ile	Thr	Leu	His	Asn	Gln	Arg	Asp	Tyr	Ile
225					230					235					240
Phe	Phe	Arg	Arg	His	Arg	Tyr	Ile	Phe	Arg	Asn	Glu	Glu	Lys	Val	Gly
				245					250					255	
Leu	Gln	Glu	Gly	Pro	Gln	Phe	Thr	Leu	Lys	Leu	Arg	Arg	Met	Gln	Lys
			260					265					270		

Gly Val Arg Gly Asp Val Val Trp Glu His Arg Pro Asp Met Glu Arg  
275 280 285

Asp Lys Lys Lys Phe Tyr Leu  
290 295

<210> 14

<211> 55

<212> PRT

<213> Candida albicans

<400> 14

Met Asn Ser Glu Lys Ile Ile Glu Val Ile Ile Ala Ile Phe Leu Pro  
1 5 10 15

Pro Val Ala Val Phe Met Lys Cys Gly Ala Thr Thr Pro Leu Trp Ile  
20 25 30

Asn Leu Val Leu Cys Ile Phe Ile Trp Phe Pro Ala Ile Leu His Ala  
35 40 45

Leu Tyr Val Val Leu Lys Asp  
50 55

<210> 15

<211> 773

&lt;212&gt; PRT

<213> Candida albicans

<400> 15

Met Thr Leu Gly Phe Asp Lys Phe Ile Ser Lys Val Ser Thr His Arg  
1 5 10 15

Arg Gln Ser Glu Pro Ser Ile Leu Glu Ile Ala Ala Thr Asn Ser Gln  
20 25 30

Asn Lys Ser Arg Arg Leu Ser Met Asp Asn Gly His Cys Tyr Val Arg  
35 40 45

Glu Ser Thr Asn Asn His His His Leu Asn Thr Val Val Asp Asn Leu  
50 55 60

Arg Gln Arg Ala Gly Ser Phe Ser Phe Ile Ser His His His Asn His  
65 70 75 80

His Gln Asn Ser His Asp Asn Tyr Thr Val Asp Pro Leu Thr Ser Asn  
85 90 95

Gly Ala Arg Ile Ser Arg Ser Arg Ser Arg Ser Lys Ser Val Gly His  
100 105 110

Gly Glu Ala Ile Ser Pro Ala Tyr Phe Ser Lys Asn Lys Thr Lys Asp  
115 120 125

Leu Val Lys Gln Glu Thr Ala His Ile Ile Ser Lys Lys Leu Leu Asn  
130 135 140

Met	Leu	Gln	Asp	Leu	Asp	Leu	Gln	Asn	Pro	Ile	Ala	Leu	Lys	Thr	Ile	145	150	155	160
Ser	Gln	Gly	Ser	Glu	Ser	Lys	Phe	Cys	Lys	Ile	Tyr	Val	Ser	Asn	Thr	165	170	175	
Asn	Asn	Cys	Ile	Tyr	Leu	Pro	Ala	Ala	Ser	Ser	Thr	Ser	Phe	Thr	Tyr	180	185	190	
Glu	Asp	Asp	Glu	Asn	Gly	Gly	Val	Ile	Ile	Ala	Glu	Asp	Arg	Asn	Asp	195	200	205	
Glu	Met	Pro	Thr	Ala	Val	Asn	Asn	Asn	Thr	Leu	Ser	Met	Asp	Ser	Ile	210	215	220	
Asn	His	Ser	Glu	Thr	Asp	Phe	Ser	Asp	Ser	Pro	Pro	Pro	Pro	Asp	Leu	225	230	235	240
Phe	Ser	Lys	Met	Lys	Ser	Phe	His	Ser	Pro	Asn	Tyr	Leu	Thr	Ser	Lys	245	250	255	
Ile	Asp	Ser	Glu	Cys	Pro	Ile	Pro	His	Thr	Phe	Ala	Val	Ile	Val	Glu	260	265	270	
Leu	Thr	Lys	Asp	Ser	Leu	Ile	Ile	Lys	Asp	Leu	His	Phe	Gln	Phe	Gln	275	280	285	
Ser	Leu	Thr	Thr	Ile	Leu	Trp	Pro	Thr	Gly	Asp	Ala	Tyr	Asn	Arg	Thr	290	295	300	
His	Ala	Lys	Glu	Lys	Phe	Thr	Ile	Gly	Asn	Met	Glu	Trp	Arg	Thr	Ser	305	310	315	320
Leu	Ser	Asp	Ala	Asp	Tyr	Tyr	Ile	Asn	Ser	Ser	Asn	Ser	Asn	Asp	Val	325	330	335	
Lys	Ser	Lys	Asn	Leu	Gly	Pro	Glu	Asp	Leu	Ile	Asn	Arg	Thr	Arg	Glu	340	345	350	
Tyr	Lys	Leu	Ile	Asp	Ile	Glu	Glu	Pro	Asn	Asn	Ser	Ser	Asn	Ser	Leu	355	360	365	
Ser	Asp	Asp	Asp	Met	Asp	Ile	Asn	Asn	Ile	Thr	Ser	Pro	Leu	Ser	Thr	370	375	380	
Ser	Pro	Thr	Ser	Ser	Ser	Thr	Ser	Thr	Asn	Ser	Thr	Ser	Asn	Ser	Leu	385	390	395	400
Gly	Ser	Asp	Ser	Tyr	Lys	Ala	Gly	Leu	Tyr	Val	Phe	Leu	Leu	Pro	Ile	405	410	415	
Leu	Leu	Pro	Glu	His	Ile	Pro	Ala	Ser	Ile	Val	Ser	Ile	Asn	Gly	Ser	420	425	430	
Leu	Ala	His	Thr	Leu	Ser	Val	Glu	Cys	Asn	Lys	Tyr	Thr	Asp	Lys	Leu	435	440	445	

Asn	Arg	Lys	Ser	Lys	Val	Ser	Ala	Ser	Tyr	Asn	Leu	Pro	Met	Val	Arg	450	455	460
Thr	Pro	Pro	Asn	Ile	Gly	Asn	Ser	Ile	Ala	Asp	Lys	Pro	Ile	Tyr	Val	465	470	475
Asn	Arg	Ile	Trp	Asn	Asp	Ala	Val	His	Tyr	Ile	Ile	Thr	Phe	Pro	Arg	485	490	495
Lys	Tyr	Val	Thr	Leu	Gly	Cys	Glu	His	Met	Ile	Asn	Val	Lys	Leu	Ser	500	505	510
Pro	Met	Val	Lys	Asp	Val	Val	Ile	Lys	Arg	Ile	Lys	Phe	Asn	Val	Leu	515	520	525
Glu	Arg	Ile	Thr	Tyr	Val	Ser	Lys	Asn	Leu	Ser	Arg	Glu	Tyr	Asp	Tyr	530	535	540
Asp	Ser	Glu	Asp	Pro	Tyr	Cys	Ile	His	Pro	Val	Ser	Lys	Glu	Asn	Lys	545	550	555
Val	Arg	Glu	Arg	Val	Val	Ser	Leu	Tyr	Glu	Leu	Lys	Thr	Lys	Ala	Lys	565	570	575
Gln	Ser	Ser	Gly	Gly	His	Leu	Glu	Ala	Tyr	Lys	Gln	Glu	Val	Met	Lys	580	585	590
Cys	Pro	Glu	Asn	Asn	Leu	Leu	Phe	Ser	Cys	Tyr	Glu	Val	Glu	Asn	Asp	595	600	605
Asn	Asn	Asn	Gly	Asn	Gly	Asn	Gly	Asn	Gly	Asn	Gly	Asn	Lys	Asn	Val	610	615	620
Lys	Gln	Lys	Asn	Lys	Asp	Gln	Pro	Met	Ile	Ala	Thr	Pro	Leu	Asp	Ile	625	630	635
Asn	Val	Ser	Leu	Pro	Phe	Leu	Thr	Thr	Met	Ser	Asp	Ser	Leu	Ile	Met	645	650	655
Thr	Ser	Ala	Ile	Glu	Glu	Glu	Gly	Ser	Asp	Ser	Pro	His	Thr	Ser	Arg	660	665	670
Arg	Gly	Ser	Ala	Val	Ser	Met	Thr	Asp	Asn	Asn	Thr	Thr	Pro	Ser	Asn	675	680	685
Asn	Asn	Pro	Leu	Ser	Pro	Phe	Leu	Gly	Ala	Val	Glu	Thr	Asn	Gly	Ala	690	695	700
Ser	Ile	Asn	Glu	Ile	Gly	Asp	His	Thr	Leu	Phe	Pro	Asp	Ser	Asn	Phe	705	710	715
Arg	His	Ile	Glu	Ile	Lys	His	Arg	Leu	Gln	Val	Thr	Phe	Arg	Ile	Ser	725	730	735
Lys	Pro	Asp	Ser	Asp	Asn	Lys	Met	His	His	Tyr	Glu	Val	Val	Ile	Asp	740	745	750

Thr Pro Ile Val Leu Leu Ser Ser Lys Cys Gln Glu Asp Ser Pro Pro  
           755                              760                              765

Pro Tyr Ser Ser Val  
           770

<210> 16  
 <211> 90  
 <212> PRT  
 <213> Candida albicans

<400> 16  
 Met Gly Glu Gly Thr Pro Ser Leu Gly Lys Arg His Asn Lys Ser His  
       1                              5                              10                              15  
 Thr Leu Cys Asn Arg Cys Gly Arg Arg Ser Phe His Val Gln Lys Lys  
                               20                              25                              30  
 Thr Cys Ser Ser Cys Gly Tyr Pro Ala Ala Lys Met Arg Ser His Asn  
                               35                              40                              45  
 Trp Ala Leu Lys Ala Lys Arg Arg Arg Thr Thr Gly Thr Gly Arg Met  
       50                              55                              60  
 Ala Tyr Leu Lys His Val Thr Arg Arg Phe Lys Asn Gly Phe Gln Thr  
       65                              70                              75                              80  
 Gly Val Ala Lys Ala Gln Thr Pro Ser Ala  
                               85                              90

<210> 17  
 <211> 19  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
           primer

<400> 17  
 tgcagctcga cctcgactg

19

<210> 18  
 <211> 19  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
           primer

<400> 18  
 gcgtgaatgt aagcgtgac

19

<210> 19  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 primer

<400> 19  
 tgagcagctc gccgtcgcgc

20

<210> 20  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 primer

<400> 20  
 gagttatacc ctgcagctcg ac

22

<210> 21  
 <211> 6671  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic DNA  
 plasmid

<400> 21  
 ttccatcggg gaaagtgggg gggaaaaaat tttaagcagt tcacaaaacc ttccaaaaaa 60  
 tatatggaca aagatgattg tattttcccg acacaaaaat cataattaat tatgagaaaag 120  
 ttaaagttaa cgttacaatt tatgtttatt tgaagggtgaa aagcgattta tgatttttcc 180  
 gaaatgaaaa ttttttttag gtattttttt tttgtcgggc aaagaaaaac tgaacaagga 240  
 ttattaaaaat ttttgggtgtt tgtttgtgtc tggagaattc attcctctct catcttcaca 300  
 caatgttttag acatctgaca cgattcatga tagttcgggt tccgggggtg gtgttttagtt 360  
 ttcgtttttc tttttttttg gaaagaatgt tttagctcat tggttttctt tcttcattca 420  
 atagttttga aagaatttgc ccacttggtt ttacaatcat ataaaattaa actttgatat 480  
 aaaatagagt ttgaaagtgt ccagatcct ttttgatttc tttgtaaatt tttttttctc 540  
 ccacatatac acacatacaa accgattttt ataagaaaga gttataccct gcagctcgac 600  
 ctgcactggt taaacctgca ggcatgcaag cttggccaaa aaggcctcga ggaacatgac 660  
 caacaagtgt ctctccaaa ttgctctcct gttgtgcttc tccactacag ctctttccat 720  
 gagctacaac ttgcttggtt tctacaaaag aagcagcaat tttcagtgtc agaagtcct 780  
 gtggcaattg aatgggaggc ttgaatactg cctcaaggac aggatgaact ttgacatccc 840  
 tgaggagatt aagcagctgc agcagttcca gaaggaggac gccgcattga ccatctatga 900  
 gatgtctccag aacatctttg ctattttcag acaagattca tctagcactg gctggaatga 960  
 gactattggt gagaacctcc tggctaattg ctatcatcag ataaaccatc tgaagacagt 1020  
 cctggaagaa aaactggaga aagaagattt caccagggga aaactcatga gcagtctgca 1080  
 cctgaaaaga tattatggga ggattctgca ttacctgaag gccaaaggag acagtcactg 1140  
 tgcttgacc atagtcagag tggaaatcct aaggaacttt tacttcatta acagacttac 1200  
 aggttacctc cgaaactgaa gatctcctag cctgtgcctc tgggactgga caattgcttc 1260  
 aagcattctt caaccagcag atgctgttta agtgactgat ggctaattga ctgcatatga 1320

aaggacacta	gaagattttt	aaatTTTTt	taaattatga	gttattttta	tttattttaaa	1380
ttttattttg	gaaaataaat	tatttttgg	gcaaaagtcc	ctcgaggcct	agcggccgcc	1440
tagaggatcc	ccgggcgcta	ggcggccgct	aggccttttt	ggccgaattc	gagctcggta	1500
cccggggaga	tccgtccccc	ttttcctttg	tcgatatcat	gtaattagtt	atgtcacgct	1560
tacattcacg	ccctccccc	acatccgctc	taaccgaaaa	ggaaggagtt	agacaacctg	1620
aagtctaggt	ccctattttat	ttttttatag	ttatgttagt	attaagaacg	ttattttatat	1680
ttcaaatttt	tctttttttt	ctgtacagac	gcgtgtacgc	atgtaacatt	atactgaaaa	1740
ccttgcttga	gaaggttttg	ggacgctcga	aggctttaat	ttgcaagcta	gcttggcgta	1800
atcatggtca	tagctgtttc	ctgtgtgaaa	ttgttatccg	ctcacaattc	cacacaacat	1860
acgagccgga	agcataaagt	gtaaagcctg	gggtgcctaa	tgagttagct	aactcacatt	1920
aattgcgttg	cgctcactgc	ccgctttcca	gtcgggaaac	ctgtcgtgcc	agagatctct	1980
gcattaatga	atcggccaac	gcgcggggag	aggcggtttg	cgtattgggc	gctcttccgc	2040
ttcctcgctc	actgactcgc	tgcgctcggt	cgctcggctg	cggcgagcgg	tatcagatcg	2100
atctcactca	aaggcggtaa	tacggttatc	cacagaatca	ggggataacg	caggaaagaa	2160
catgtgagca	aaaggccagc	aaaaggccag	gaaccgtaaa	aaggccgcgt	tgctggcggt	2220
tttccatagg	ctccgcccc	ctgacgagca	tcacaaaaat	cgacgctcaa	gtcagagggtg	2280
gcgaaacccg	acaggactat	aaagatacca	ggcgtttccc	cctggaagct	ccctcgtgcg	2340
ctctcctggt	ccgaccctgc	cgcttacccg	atacctgtcc	gcctttctcc	cttcgggaag	2400
cgtggcgctt	tctcatagct	cacgctgtga	gtatctcagt	tcggtgtagg	tcgttcgctc	2460
caagctgggc	tgtgtgcacg	aaccccccg	tcagcccgac	cgctgcgcct	tatccggtaa	2520
ctatcgtctt	gagtccaacc	cgtaagaca	cgacttatcg	ccactggcag	cagccactgg	2580
taacaggatt	agcagagcga	ggtatgtagg	cggtgctaca	gagttcttga	agtggtagcc	2640
taactacggc	tacactagaa	ggacagtatt	tggtatctgc	gctctgctga	agccagttac	2700
tttcggaaaa	agagtggta	gctcttgatc	cggcaaaaa	accaccgctg	gtagcgggtg	2760
tttttttgg	tgcaagcagc	agattacgcg	cagaaaaaaa	ggatctcaag	aagatccttt	2820
gatcttttct	acggggtctg	acgctcagtg	gaacgaaaa	tcacgttaag	ggatttttgg	2880
catgagatta	tcaaaaagga	tcttcacct	gatcctttta	aattaaaaat	gaagttttaa	2940
atcaatctaa	agaagtggat	ctaggaaaa	ttaatTTTT	cttcaaaatt	tagttagatt	3000
agtatatatg	agtaaacttg	gtctgacagt	taccaatgct	taatcagtga	ggcacctatc	3060
tcagcgatct	gtctatttct	ttcatccata	gttgccctgac	tccccgctgt	gtagataact	3120
acgatacggg	agggctttacc	atctggcccc	agtgcctgca	tgataccgcg	agaccacgc	3180
tcaccggctc	cagattttatc	agcaataaac	cagccagccg	gaagggccga	gcgcagaagt	3240
ggtcctgcaa	ctttatccgc	ctccatccag	tctattaatt	gttgccggga	agctagagta	3300
agtagttcgc	cagttaatag	tttgcgcaac	gttggtgcca	ttgctacagg	catcgtgggtg	3360
tcacgctcgt	cgtttggtat	ggcttcattc	agctccgggt	cccaacgatc	aaggcgagtt	3420
acatgatccc	ccatggttg	caaaaaagcg	gttagctcct	tcggtcctcc	gatcgttgct	3480
agaagtaagt	tggcgcagtg	gttatcactc	atggttatgg	cagcactgca	taattctctt	3540
actgtcatgc	catccgtaag	atgcttttct	gtgactgggtg	agtactcaac	caagtcattc	3600
tgagaatagt	gtatgcggcg	accgagttgc	tcttgcccg	cgtcaatacg	ggataatacc	3660
gcgccacata	gcagaacttt	aaaagtgtc	atcattggaa	aacgttcttc	ggggcgaaaa	3720
ctctcaagga	tcttaccgct	gttgagatcc	agttcgatgt	aaccactcgc	tgacccaac	3780
tgatcttcag	catcttttac	tttcaccagc	gtttctgggt	gagcaaaaa	aggaaggcaa	3840
aatgccgcaa	aaaagggaat	aagggcgaca	cggaaatgtt	gaatactcat	actcttctct	3900
tttcaatatt	attgaagcat	ttatcagggt	tattgtctca	tgagcggata	catatttgaa	3960
tgtattttaga	aaaataaaca	aataggggtt	ccgcgcacat	ttccccgaaa	agtgccacct	4020
gacgtctaag	aaaccattat	tatcatgaca	ttaacctata	aaaataggcg	tatcacgagg	4080
ccctttcgtc	tcgcgcgttt	cgggtgatgac	ggtgaaaacc	tctgacacat	gcagctccc	4140
gagacggtca	cagcttgtct	gtaagcggat	gccgggagca	gacaagccc	tcagggcgcg	4200
tcagcgggtg	ttggcgggtg	tcggggctgg	cttaactatg	cggcatcaga	gcagattgta	4260
ctgagagtgc	accatattcga	cgctctccct	tatgcgactc	ctgcattagg	aagcagccca	4320
gtagtaggtt	gaggccgttg	agcaccgcgc	ccgcaaggaa	tggtgcatgc	aaggagatgg	4380
cgcccaacag	tcccccgcc	acggggcctg	ccaccatacc	cacgccgaaa	caagcactaa	4440
taggaattga	tttggaatgg	ataaacggaa	acaaaaaaaa	gagctgggtac	tactttcttt	4500
aaaatttatt	tattatttga	ttttatttta	tagtatatat	tatatatttga	acgtagatta	4560
tttttttga	agttgctgta	gtgccattga	ttcgtaacac	taattctgta	ttagtcattc	4620
ctcttggttg	atagtatcca	aaaaaacggc	tatttttttg	caatcttatt	tctgcataat	4680
tatacagata	acataatgaa	agaaaaaatc	tttttttttg	ttcttcaatg	atgatttcaa	4740
ccattctttt	aaacattgat	caattcctga	gcaacaaccc	catacacact	ggtttatata	4800



```

ccgcccccttt tacagttgaa gaaagaaata gaaatagaaa tagcaaacaa aagatatgac 4860
agtcaacact aagacctata gtgagagagc agaaactcat gcctcaccag tagcacagcg 4920
attattttcga ttaatggaac tgaagaaaac caatttatgt gcatcaattg acgttgatac 4980
cactaaggag ttcctcgagt taattgataa attaggtcct tatgtatgct taatcaagac 5040
tcatattgat ataatcaatg atttttccta tgaatccact attgaaccat tattagaact 5100
ttcacgtaaa catcaattta tgatttttga agatagaaaa tttgctgata ttggtaatatc 5160
cgtaaagaaa caatatattg gtggagttta taaaattagt agttgggcag atattaccaa 5220
tgctcatggt gtcactggga atggagtggg tgaaggatta aaacagggag ctaaagaaac 5280
caccaccaac caagagccaa gagggttatt gatgttagct gaattatcat cagtgggac 5340
attagcatat ggagaatatt ctcaaaaaac tgttgaaatt gctaaatccg ataaggaatt 5400
tgttattgga tttattgccc aacgtgatat ggggtggccaa gaagaaggat ttgattggct 5460
tattatgaca cctggagttg gattagatga taaaggtgat ggattaggac aacaatatag 5520
aactgttgat gaagttgtta gcaactggaac tgatattatc attgttggtta gaggattgtt 5580
tggtaaagga agagatccag atattgaagg taaaaggat agaaatgctg gttggaatgc 5640
tattttgaaa aagactggcc aattataaat gtgaaggggg agattttcac tttattagat 5700
ttgtatatat gtagaataaaa taaataaata agttaaataa ataattaaat aagggtggta 5760
attattacta tttacaatca aagggtggcc ttctagctgt aatccgggca gcgcaacgga 5820
acattcatca gtgtaaaaat ggaatcaata aagccctgcg ctcatgagcc cgaagtggcg 5880
agcccgatct tccccatcgg tgatgtcggc gatataggcg ccagcaaccg cacctgtggc 5940
gccgcagcgc gcagggtcag cctgaatacg cgtttaatga ccagcacagt cgtgatggca 6000
aggtcagaat agcccaagtc ggccgagggg cctgtacagt gaggggaagat ctgatattga 6060
cgaagaggaa ccaatgtaac gttacactga agaaaacaca caataaacgg gaagaaacgg 6120
tgtaaaagtg tgaaaataat ttttgaatat catttccctt ggtttaattc caaacgaaac 6180
gtgttttttt tagagaatgg gaattcttat tggatgtcta gattgtttgt ttactccaga 6240
ctgtgcacaa aaacgtttgg atggatgatc agaagatatt tttaggctta gctctaaata 6300
taagaaatga tgcttgaaaa accagacaga aattgagttt caaaaattgg taatgtgagg 6360
tattagtcaa ctaaccaa atacaatgcaa accggttgat acatttcatt ttgaaaataa 6420
tgaaactgga attggatgac cagcacacaa acacataaag taattatggg aattagaagc 6480
gaacatagag gagtacttgg ccacgaacag aatacaagtg ggaacactat tttctccatt 6540
gttttagttc tgtttttttg tcagcctagt tttgtgctat gtgtaaaaaa tattgccaag 6600
aaaaaaagct tgttttgtgg ccagtgtccg aaaaaattt tggggaatct tcggattaat 6660
ttatgttttc a 6671

```

<210> 22

<211> 7127

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic DNA  
plasmid

<400> 22

```

agcttgagta ttctatagtg tcacctaaat agcttggcgt aatcatgggtc atagctgttt 60
cctgtgtgaa attgttatcc gtcacaaatt ccacacaaca tacgagccgg aagcataaag 120
tgtaaaagcct ggggtgccta atgagtgagc taactcacat taattgcgtt gcgctcactg 180
cccgttttcc agtcgggaaa cctgtcgtgc cagctgcatt aatgaatcgg ccaacgcgcg 240
gggagaggcg gtttgcgtat tgggcgctct tccgcttcct cgctcactga ctgcgtgcgc 300
tcggtcgttc ggctgcggcg agcgggtatca gctcactcaa aggcggtaat acggttatcc 360
acagaatcag gggataacgc aggaaagaac atgtgagcaa aaggccagca aaaggccagg 420
aaccgtaaaa aggcgcggtt gctggcggtt tccataggc tccgcccccc tgacgagcat 480
cacaaaaatc gacgctcaag tcagaggtgg cgaaacccga caggactata aagataccag 540
gcgtttcccc ctggaagctc cctcgtgcgc tctcctgttc cgaccctgcc gcttaccgga 600
tacctgtccg ctttctccc ttcgggaagc gtggcgcttt ctcatagctc acgctgtagg 660
tatctcagtt cgggtgtaggt cggtcgctcc aagctgggct gtgtgcacga acccccgtt 720
cagcccgacc gctgcgcctt atccggtaac tatcgtcttg agtccaaccc ggtaagacac 780
gacttatcgc cactggcagc agccactggg aacaggatta gcagagcgag gtatgtaggc 840

```

```

gggtgctacag agttcttgaa gtggtggcct aactacggct acactagaag gacagtat 900
ggtatctgcg ctctgctgaa gccagttacc ttcggaaaaa gagttggtag ctcttgatcc 960
ggcaaaacaaa ccaccgctgg tagcgtggtg ttttttggtt gcaagcagca gattacgcgc 1020
agaaaaaaag gatctcaaga agatcctttg atcttttcta cgggggtctga cgctcagtgg 1080
aacgaaaact cacgttaagg gatttttggtc atgagattat caaaaaggat cttcacctag 1140
atccttttaa attaaaaatg aagttttaaa tcaatctaaa gtatatatga gtaaaactgg 1200
tctgacagtt accaatgctt aatcagttag gcacctatct cagcgatctg tctatttcgt 1260
tcatccatag ttgcctgact ccccgctctg tagataacta gaccacgct caccggctcc 1320
agatttatca gcaataaacc agccagccgg aagggccgag cgcagaagtg gtcctgcaac 1380
tttatccgcc tccatccagt ctattaattg ttgccgggaa gctagagtaa gtagttcgcc 1440
agttaaatag ttgcgcaacg ttgttgccat tgctacaggc atcgtggtgt cagctcgtc 1500
gtttggtagt gcttcattca gctccggttc ccaacgatca aggcgagtta catgatccc 1560
catgttgtgc aaaaaagcgg ttagctcctt cggctcctcg atcgttgtca gaagtaagtt 1620
ggccgcagtg ttatcactca tggttatggc agcactgcat aattctctta ctgtcatgcc 1680
atccgtaaga tgcttttctg tgactggtga gtactcaacc aagtcattct gagaatagtg 1740
tatgccggcg ccgagttgct cttgcccggc gtcaatacgg gataataccg cgccacatag 1800
cagaacttta aaagtgtcga tcattggaaa acggtctctc gggcgaaaaa tctcaaggat 1860
cttaccgctg ttgagatcca gttcgatgta accactcgt gcaccaact gatcttcagc 1920
atcttttact ttcaccagcg tttctgggtg agcaaaaaa ggaaggcaaa atgccgcaaa 1980
aaaggggaata agggcgacac ggaaatgttg aatactcata ctcttctctt ttcaatatta 2040
ttgaagcatt tatcagggtt attgtctcat gagcggatag atatttgaat gtatttagaa 2100
aaataaacaa ataggggttc cgcgcacatt tccccgaaaa gtgccacctg acgtctaaga 2160
aaccattatt atcatgacat taacctataa aaataggcgt atcacgaggc ctttcgtct 2220
cgcgcgtttc ggtgatgacg gtgaaaacct ctgacacatg cagctcccg agacggtcac 2280
agcttgtctg taagcggatg ccgggagcag acaagcccg cagggcgctg cagcgggtgt 2340
tggcgggtgt cggggctggc ttaactatgc ggcacagatg cgtaaggaga aaataccgca tcaggcgaaa 2400
ccatatgcgg tgtgaaatac cgcaacatgc ttaaaattcg cgtaaaatat ttgttaaatc agctcatttt 2520
ttaaccaata ggccgaaatc ggcaaaatcc cttataaatc aaaagaatag accgagatag 2580
ggttagagtg ttgtccagtt tggaacaaga gtccactatt aaagaacgtg gactccaacg 2640
tcaaagggcg aaaaaccgtc tatcagggcg atggcccact acgtgaacca tcacccaaat 2700
caagtttttt gcggtcgagg tgccgtaaag ctctaaatcg gaaccctaaa gggagcccc 2760
gatttagagc ttgacgggga aagccggcga acgtggcgag aaaggaagg gaaagagcga 2820
aaggagcggg cgctaggggc ctggcaagtg tagcgggtcac gctgcgcgta accaccacac 2880
ccgccgcgct taatgcgccg ctacagggcg cgtccattcg ccattcaggc tgcgcaactg 2940
ttgggaaggg cgatcgggtg gggcctcttc gctattacgc cagctggcga aagggggatg 3000
tgctytagt gccattgatt gggtaacgcc agggttttcc cagtcacgac gttgttaaac 3060
gacggccagt gaattgtaat acgactcact atagggcgaa ttggttttcc aatgatgagc 3120
acttttaag ttctgctatg tggcgcggtg ttatcccggt ttgacgccgg gcaagagcaa 3180
ctcggtcgcc gcatacacta ttctcagaat gacttggttg agtactaata ggaattgatt 3240
tggtgggtat aaacggaaac aaaaaaaaga gctgggtacta ctttctttta aattatttta 3300
ttatttgatt ttatttaata gtatatatta tattttgaac gtagattatt ttgtgaaag 3360
ttgctytagt gccattgatt cgtaacacta attctgtatt agtcattcct cttgtttgat 3420
agtatccaaa aaaacggcta tttttttgca atcttatttc ctgcatatta tacagataac 3480
ataatgaaag aaaaaatctt tttttttgtt cttcaatgat gatttcaacc attcttttaa 3540
acattgatca attcctgagc aacaaccca tacacactgg tttatatacc gccctttta 3600
cagttgaaga aagaaataga aatagaaata gcaaacaaaa gatatgacag tcaacactaa 3660
gacctatagt gagagagcag aaactcatgc ctcaccagta gcacagcgat tatttcgatt 3720
aatggaactg aagaaaacca atttatgttc atcaattgac gttgatacca ctaaggaaat 3780
ccttgaatta attgataaat taggtcctta tgtatgctta atcaagactc atattgatatt 3840
aatcaatgat ttttctatg aatccactat tgaaccatta ttagaacttt cacgtaaaca 3900
tcaatttatg atttttgaag atagaaaatt tgctgatatt ggtaataacc taaagaaaca 3960
atatattggt ggagtttata aaattagtag ttgggcagat attaccaatg ctcatgggtg 4020
cactgggaat ggagtgggtg aaggattaaa acagggagct aaagaaacca ccaccaacca 4080
agagccaaga gggttattga tgttagctga attatcatca gtgggatcat tagcatatgg 4140
agaatattct caaaaaactg ttgaaattgc taaatccgat aaggaatttg ttattggatt 4200
tattgcccac cgtgatatgg gtggccaaga agaaggattt gattggctta ttatgacacc 4260
tggagtggga ttagatgata aaggtgatgg attaggacaa caatatagaa ctgttgatga 4320

```

```

agttggttagc actggaactg atattatcat tgttggttaga ggattggttg gtaaaggaag 4380
agatccagat attgaaggta aaaggatatag aaatgctggg tggaatgctt atttgaaaaa 4440
gactggccaa ttataaatgt gaagggggag attttcactt tattagattt gtatatatgt 4500
agaataaata aataaataag ttaaataaat aattaaataa ggggtggtaat tattactatt 4560
tacaatcaaa ggtgggcctt ctagctgtaa tccgggcagc gcaacggaac attcatcagt 4620
gtaaaaatgg aatcaataaa gccctgcgca gcgcgcaggg tcagcctgaa tacgcgttta 4680
atgaccagca cagtcgtgat ggcaagggtca gaatagccca agtcggccga ggggcctgta 4740
cagtgaagga agatctgata ttgacgaaga ggaaccaatg taacgttaca ctgaagaaaa 4800
cacataataa acgggaagaa acggtgtaaa agtgtgaaaa taatttttga atatcatttc 4860
ccttggttta attccaaacg aaacgtgtat ttttttagag aatgggaatt cttattggat 4920
gtctagattg tttgtttact ccagactgtg cacaaaaacg tttggatgga tgatcagaag 4980
atatttttag gcttagctct aaatataaga aatgatgctt gaaaatccag acagaaattg 5040
agtttcaaaa atttggaatg tgaggtatta gtcaactaac caaataacaa tgcaaacccg 5100
ttgatacatt tcatttttgaa aataatgaaa ctggaattgg atgaccagca cacaaacaca 5160
taaagtaatt atgggaatta gaagcgaaca tagaggaata ctttgccacg aacagaatac 5220
aagtgggaac acttttttct ccattgtttt agttctgttt ttttgtcaaa ctggttttgt 5280
gctatgtgta aaaaaatatt gccaaagaaa aaagcttggt ttgtggccag tgtccgaaaa 5340
aaattttggg gaagcttcgg attaatattt ttttttattc catcggggaa agtggggggg 5400
aaaaaaaaat taagcagttc ataaaaacct ccaaaaaata tatggacaga gatgattgta 5460
ttttcccgac accaaaatca taattaacta tgagaaaatt gaatgtaacg ttacaattta 5520
tttttatttg aagctgaaaa gcgatttatg atttttccga aatgaaaatt ttttttaggt 5580
ttattttttt tgtcgggcaa agaaaaactg aacaaggatt attaaaaatt ttggtgtttg 5640
tttgtgtctg gagaattcat tcctctctca tcttcacaca atgttttagac atctgacacg 5700
attcaaaata gttcgggttc cggggttggt gttttagttt cgtttttcgt ttttttgga 5760
aagaatgttt tagctcattg gttttctttc ttcatcaat agttttgaaa gaatttgccc 5820
acttgttatt acaatcatat aaaattaaac tttgatataa aatagagttt gaaagtttcc 5880
cagatccttt ttgatttctt tgtaattttt ttttctccca catatacaca catacaaac 5940
gattttttata agaaagagtt ataccctgca gctcgacctc gagggatccg ggccctctag 6000
atgcggccgc taggcctcga gggacttttg caccaaaaaa aattttattt ccaaaaaata 6060
atttaaataa ataaaaataa ctcataattt aataaaaaat tcaaaatctt ctagtgtcct 6120
ttcatatgca gtacattagc catcagtcac ttaaacagca tctgctggtt gaagaatgct 6180
tgaagcaatt gtccagtcct agaggcacag gctaggagat cttcagtttc ggaggttaacc 6240
tgtaagtctg ttaatgaagt aaaagttcct taggatttcc actctgacta tgggtccaggc 6300
acagtgactg tactccttgg ccttcaggta atgcagaatc ctcccataat atcttttcag 6360
gtgcagactg ctcatgagtt ttccccgtgt gaaatcttct ttctccagtt tttcttccag 6420
gactgtcttc agatggttta tctgatgata gacattagcc aggaggttct caacaatagt 6480
ctcattccag ccagtgctag atgaatcttg tctgaaaata gcaaagatgt tctggagcat 6540
ctcatagatg gtcaatgcgg cgtcctcctt ctggaaactgc tgcagctgct taatctctc 6600
agggatgtca aagttcatcc tgtccttgag gcagtattca agcctcccat tcaattgcc 6660
caggagcttc tgacactgaa aattgctgct tctttgtagg aatccaagca agttgtagct 6720
catggaaaga gctgtagtgg agaagcacia caggagagca atttggagga gacacttgtt 6780
ggtcatgttc ctcgaggcct ttttgccag ctggcgccgt ctgcgcgacg gcgagctgct 6840
caccacccag gatccgtccc ccttttcctt tgtcgatatc atgtaattag ttatgtcacg 6900
cttacattca cgccctcccc ccacatccgc tctaaccgaa aaggaaggag ttagacaacc 6960
tgaagtctag gtccctattt atttttttat agttatgtta gtattaagaa cgttattttat 7020
atttcaaatt tttctttttt ttctgtacag acgcgtgtac gcatgtaaca ttatactgaa 7080
aaccttgctt gagaagggtt tgggacgctc gaaggcttta atttgca 7127

```

<210> 23

<211> 11

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 23  
gttggccttt t

11

<210> 24  
<211> 8  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
primer

<400> 24  
aggccaac

8